REMARKS

These remarks are in response to the Final Office Action mailed December 1, 2004. No claims have been amended. Applicants respectfully request consideration of the following additional remarks and allowance of the claims.

Should the Examiner wish to discuss the claims, remarks or disposition of the case in further detail, the Examiner is respectfully asked to call the undersigned at 619.446.5624.

I. REJECTION UNDER 35 U.S.C. §112, FIRST PARAGRAPH

Claims 1, 2 and 9-15 stand rejected under 35 U.S.C. §112, first paragraph as allegedly lacking enablement. Applicants respectfully traverse this rejection.

Applicants have demonstrated the utility and enablement of the invention to satisfy the scope of the pending claims. In one aspect, Applicants have demonstrated the applicability of the claimed invention to 5 general classes of analytes: alcohols (see Examples) and to halogenated hydrocarbons, aromatics, unsubstituted hydrocarbons, and esters (see, e.g., Sisk and Lewis, Appendix A of response filed August 27, 2004). Accordingly, Applicants have demonstrated the applicability of the invention to analytes (thus satisfying claim 1) and chemicals (thus satisfying claim 2). The allegation in the Office Action appears to question the scope of biochemicals and the like. Each of the foregoing tested analytes is characteristic of most if not all side groups present in organic molecules including amino acids (building blocks of proteins and enzymes), nucleic acids (building blocks of DNA/RNA), lipids (e.g., hormones) and the like. Biochemicals and/or organic molecules are defined as containing at least one or more of the functional groups or

chemical entities tested (e.g., the 5 classes mentioned above). Thus, the tested group of molecules can be associated with the genus "biochemicals" or "organic molecules," thus satisfying claim 3.

Furthermore, the number of species demonstrated to work in the methods and systems of the invention has been oversimplified in the present Office Action as merely 5 *classes* of analytes: alcohols, halogenated hydrocarbons, aromatics, unsubstituted hydrocarbons, and esters. It is submitted that at least *SEVENTY-FIVE* species have been tested and demonstrated to work in the system and methods of the invention. The species are set forth in Table 1 (see also Sisk and Lewis reference of record).

Table 1

Alcohols	Halides	Aromatics	Hydrocarbons	Esters
Methanol	1-chlorobenzene	Benzene	Cyclooctane	Isopropyl acetate
Cyclopentanol	1-bromobutane	Propyl benzene	n-Hexane	Butyl acetate
2-butanol	Cyclohexyl chloride	m-xylene	n-octane	Pentyl acetate
1-pentanol	1,1,2-trichloroethane	o-xylene	n-decane	Methyl acetate
2-pentanol	1-bromopentane	p-xylene	3,3-dimethyl 1-butene	Isobutyl acetate
3 pentanol	3-chloro 2-methyl propene	Isopropyl benzene	n-heptane	Trans-2-hexenyl acetate
Isopropanol	1-chloropropane	Ethyl benzene	n-nonane	Hexyl acetate
Ethanol	2-chlorobutane	Toluene	Cyclopentane	Isopentyl acetate
1-butanol	1-fluorobenzene	1,2,4-trimethyl benzene	2,2,4-trimethyl pentane	Ethyl propionate
2-methyl 1-propanol	1-iodopropane	2,6-lutidine	Cyclohexane	Propyl acetate
3-methyl 1-butanol	2-bromo 2-methylpropane	2-picoline	n-pentane	Sec-butly acetate
2-methyl 2-butanol	1-iodobutane	Pyridine	2,5-dimethyl 2,4-hexadiene	Isopentyl propionate
2-propen-1-ol	Chloroform	Anisole	2-methyl 2-butene	Pentyl butyrate
1-hexanol	Methylene chloride		7-methyl 1,6 octadiene	Isopentyl benzoate
2-methyl 3-buten-2-ol	1-chlorobutane		1,7-octadiene	Ethyl butyrate
			Cyclopentene	
			cyclooctene	

Amino acids, carbohydrates, nucleic acids, lipids are all chemical entities. These 5 *classes* of compounds represent a genus of analytes that include basically all types of functional groups encountered in chemistry and biochemistry, including those in hormones, amino acids, enzymes, and the like. For example, hydrocarbons

are compounds with only C and H and include 4 classes: alkanes, alkenes, alkynes, and aromatics. One or more of these 4 classes are present in amino acids and other biomolecules. Alcohol side groups are also present in these various biomolecules.

The Office Action states, for example, that lipids and fatty acids have some similarities to alcohols but allegedly would not be expected to have the same chemical properties because of different functionalities. Applicants fail to see the reasoning in this statement. Lipids and fatty acids (e.g., hormones) not only have some resemblance to alcohols, but they are also long chain *hydrocarbons*. Applicants have shown that hydrocarbons and alcohols work in the methods and systems of the invention. Analytes comprising alcohols and/or hydrocarbons are detected and produce a signal profile using the sensor systems of the invention. Accordingly, the same alcohols and/or hydrocarbons on a lipid (e.g., a hormone) would also generate a signal profile.

The Office Action also states that Sisk and Lewis show that chemical functionalities can be discerned, however, the Office Action then alleges that this has little kinship to enzymatic activity, binding activity, or modulating activity. Applicants submit that the signal profile obtained from an unknown analyte (e.g., a chemical, a polypeptide, enzyme, antibody, lipid, etc.) is compared to profiles of other chemicals, polypeptides, enzyme, antibody, lipid etc. that have been associated with known enzymatic activity, binding activity and the like. A closest match between the signal profile of the unknown analyte and the profile of the known analytes is then made and the system indicates that the nearest match has, for example, a particular enzymatic activity, binding activity, structural characteristic (which are often indicative of enzyme activity and binding activity).

Applicants have shown that (a) the methods and systems of the invention can predict interaction of an analyte with an enzyme (e.g., P-450 enzyme system), by using a series of alcohols as a test example; (b) that the methods and systems of the invention can predict chemical classes, by using a collection of 75 species in 4 chemically different functional group genuses as a test set; and (c) that the methods and systems of the invention can predict a set of other chemical and physical properties using a collection of 75 species that span basically the entire functionality of organic chemistry and biochemistry in their genus.

The Examiner appears to recognize that Applicants have demonstrated the applicability of the methods and systems of the invention to a genus of analytes comprising alcohols, halogenated hydrocarbons, unsubstituted hydrocarbons, aromatics and esters. These analytes represent organic molecules and as such this genus can also be stated to be organic molecules. Organic molecules include amino acids, nucleic acid, lipids, and the like.

Furthermore, the Office Action indicates that the sensor array of the Sisk and Lewis reference comprise an array of electrical resistance and as such allegedly other sensor systems would not work in the methods and systems of the invention. Applicants respectfully disagree. Applicants respectfully disagree.

Other sensor types can utilize the same polymer compositions and mixtures to arrive at the invention. For example, one of skill in the art will recognize that optical or mechanical sensors can be made by coating the transducer elements with various polymers. If one were to use the same collection of polymers demonstrated to work in Sisk and Lewis, but transduce the signal using optical or mechanical transducers instead of electrical transduction, a signal profile would be obtained

upon contact with an analyte. After all, only the transducers differ in what physical type of signal they deliver, but are transducing the same fundamental pattern of responses from the same collection of materials to the same analyte. In other words, the polymers themselves would be interacting with the analyte in a similar fashion, but the transducer would merely be optical or mechanical compared to electrical. Furthermore, there are numerous sensor modalities known in the art that are used for testing glucose levels, measuring the molecular weight of a molecule, identifying the chirality, and the like. Such sensors include those of record (see, also, U.S. Patent No. 6,846,638 and U.S. Patent No. 6,839,636). However, unlike Applicants' invention, the prior art sensors were specifically designed to detect such characteristics or to compare to a database that included the analyte being detected (i.e., a presence or absence system). In contrast, Applicants' invention uses fingerprint information from any number of sensors and sensor-types to identify based on, for example, a best-fit algorithm the analyte being detected. The fingerprint may be a fingerprint of resistive-sensors, a fingerprint from optical sensors, magnetic sensors, acoustic sensors or any combination thereof. The sensors provide a fingerprint of the analyte that is being contacted with the sensor array. This fingerprint is then compared to a database that does "not includ[e] the analyte" (see, e.g., claim 1) being detected. A nearest match is made to fingerprints from known analytes having characteristics associated with fingerprints of the known analytes including, for example, the type of analyte, the activity of the analyte, where the analyte is located in the environment and the like.

For at least the foregoing reasons, Applicants respectfully submit that the invention is enabled and respectfully request withdrawal of the §112, first paragraph rejection of claim 1-2 and 9-15.

Claims 3-8 stand rejected under 35 U.S.C. §112, first paragraph as allegedly lacking enablement. Applicants respectfully traverse this rejection.

Applicants respectfully refer the Examiner to the remarks above, which are also appropriate to this rejection. As discussed above, the invention utilizes fingerprints from a modality of different types of sensors. The array may comprise a single type of sensor or a combination of sensor-types. The array provides a signal profile ("fingerprint") of an analyte when exposed to the analyte. As such the fingerprint is indicative of various characteristics of the analyte that can then be used to compare the analyte to other analytes in a library. A nearest match would be indicative of the type (e.g., the chemical class, enzyme class, antibody class) and associated characteristics of the nearest match.

In addition, the various 75 species shown to work in the methods and systems of the invention include building blocks and side chains of other chemical entities such as proteins, lipids, nucleic acids. Alcohols, hydrocarbons and the like are biochemicals and are subunits of larger biochemicals. Thus, Applicants submit that the species shown to work in the methods and systems of the invention are indicative of other biochemicals such as proteins (e.g., enzyme, antibodies, receptors), nucleic acids, lipids (e.g., hormones), and the like.

Accordingly, Applicants respectfully request withdrawal of the §112, first paragraph rejection.

Applicants respectfully request allowance of the pending claims. Should the Examiner have any further questions or would like to discuss any remaining issue, the Examiner is invited to call the undersigned.

Please charge any required fee for consideration of this response or credit any overpayment to Deposit Account No. 02-4800, referencing the Attorney Docket No. above.

Respectfully submitted,

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